

### Ice chopper

The present invention relates to an ice chopper according to the preamble of patent claim 1, for chopping, crushing or breaking up ice and other liquid frozen foodstuffs.

Onion and vegetable choppers are known from EP-B-0'345'223 and WO01/58652 of the applicant. They comprise a housing able to be pushed over the product to be broken up and a knife which is guided in the housing and which may be displaced by way of an actuating mechanism with a push button and a plunger against the force of a spring. The knife comprises a cylindrical arbour on whose lower end a plate-like knife holder is seated. On the lower side of the knife holder there are fastened one or more downwardly projecting blades which in a plan view are mostly designed wave-shaped or star-shaped. The knife may be displaced downwards against the force of the spring until the blade has completely penetrated the material to be chopped and abuts the base plate of the chopper. For the perfect functioning of all known choppers it is decisive that the lower cutters or cutter edges of the blades lie exactly in a horizontal plane.

Although such choppers are not designed for this, ice cubes are often cut up with such known choppers in order to obtain finer pieces of ice for cocktails, drinks or for preparing foodstuffs. The chopping of ice may very easily blunt or bend the known blades. Bent blades jam very quickly with the scrapers and by way of this very significantly compromise the functioning ability of the chopper.

It is therefore the object of the invention to provide an apparatus which alleviates these disadvantages.

An ice chopper according to the present invention achieves this object.

Hereinafter, embodiments examples of the invention are described by way of the accompanying drawings. There are shown in:

- Fig. 1            a partial longitudinal section through an ice chopper according to one embodiment form of the invention;
- Fig. 2a           a longitudinal section through a beaker according to a preferred embodiment form of the invention;
- Fig. 2b           a view from above into a beaker according to Figure 2a;

- Fig. 3a            a longitudinal section through a shaker attachment [top] with a lid;
- Fig. 3b            a view of the opened shaker attachment [top] (without lid) according to Fig. 3a, from above;
- Fig. 4a            a partial view of a knife according to a preferred embodiment form of the invention;
- Fig. 4b            a part view of a blade according to a further preferred embodiment form of the invention;
- Fig. 4c            a longitudinal section through a cutter of a knife according to Figure 4a; and
- Fig. 4d            a longitudinal section through the cutter according to Figure 4b

The ice chopper shown in Figure 1 comprises a housing which consists of a multi-part upper part 2 and a preferably single-part lower part or beaker 3. The beaker 3 is connected to the upper part 2 by way of a bayonet closure 33 or likewise. Similarly to the known onion and vegetable choppers, an actuation mechanism 4 is concentrically mounted and guided in the housing upper part 2, and this mechanism comprises a push button 17 with a cap 18. In the housing upper part there is attached a knife 5 which may be displaced against the force of a spring by way of the actuation mechanism 4. The actuation mechanism 4 comprises a known positive displacement mechanism which is known and thus is not shown in detail in Figure 1. The positive displacement mechanism ensures that with each to and fro movement the knife 5 rotates about its longitudinal axis by a certain angle. This rotation movement ensures that the knife does not chop on the spot. In contrast to known vegetable choppers, with the present ice chopper one may do away with the scraper which may be pushed over the knife.

The knife 5 comprises a cylindrical arbour 11 on whose lower end there is seated a horizontally arranged plate-like carrier plate 6. On the lower side of the carrier plate there are fastened one or more downwardly projecting blades 51 which in a plan view are mostly wave-shaped or star-shaped. The present invention may be realised with all known previously mentioned blade shapes. For reasons of cost, the arbour 11 and the carrier plate 6 are mostly manufactured as one piece by way of injection moulding, wherein one injects around the blade 51 in an upper region and by way of this it becomes nondetachably fastened to the carrier plate. In order to withstand the loading during chopping, the knife 5 is preferably manufactured of sturdy blade sheet metal of 0.3 to 0.5, in particular 0.4 mm thickness D.

In a preferred embodiment form of the present invention, as is shown in Figure 1, the height  $H_K$  of the blade 51, the height of the beaker  $H_B$  and the maximal vertical path of the knife limited by the actuation mechanism are selected and matched to one another such that the blade 52 in its lowermost position does not come into contact with a beaker base 31. Thus in the lowermost knife position (in Figure 1 shown dashed) there remains an air gap  $H_S$  between the downwardly directed tips of teeth 53 of the blade 52 and the base of the beaker 31.

As will yet be further specified, the beaker fulfils a double function and is also used as a shaker lower part. It is therefore manufactured of stainless steel in a preferred embodiment form. The air gap  $H_S$  thus prevents a direct abutment of the blade 52 with the stainless steel base and due to this prevents an undesired blunting of the blade and damage and scratching of the base 31. The height of the air gap  $H_S$  is preferably between 1 and 7 mm, and is particularly preferably between 3 and 5 mm.

If in a further embodiment form which is not shown, the above-described beaker is replaced by a cylindrical housing part open to the bottom, then its height is again selected such that sensitive working surfaces are not contacted by the blades and may not be damaged on chopping.

Whilst with known choppers such an air gap is not desired at all since it would lead to an unacceptable compromising of its functioning, with the present new ice chopper a complete penetration of the ice cubes to be chopped is not necessary. The ice cubes are broken apart by the sturdy blade 51, and do not need to be completely severed.

The breaking-apart effect of the blade is further encouraged by preferred designs of the blade. With the blade shown in Figure 4a and 4c the teeth are ground on both sides, wherein the cutting angle  $\gamma$  is preferably selected between 30 and 100°. With the blade shown in Figure 4b and 4c the teeth are ground on only one side and the cutting angle  $\gamma'$  is about 45°.

The tothing of the blade may be selected according to the blade material and the manufacturing costs. Two possible tooth shapes are shown in the Figures 4a and 4b. On chopping the hard and brittle ice cubes, the significant advantage of the toothed blades is that the teeth or the tips of the teeth simplify the penetration into the ice to be chopped.

In a further embodiment form which is not shown the teeth are bent alternately laterally out of the vertical plane of the blade and by way of this again reinforce the breaking-up effect of the ice chopper blade. The teeth may also be bent out of the vertical plane of the blade sheet metal twisted about their vertical axis so that the tips of the teeth still essentially lie in one plane

and may penetrate the ice with relatively little resistance, and the breaking-up effect is enormously increased on further penetration due to the torsion of the teeth.

In Figure 2b there is represented an underlay 7 adapted to the beaker, preferably of a soft elastomer such as silicone. The underlay 7 may be rigidly or detachably connected to the beaker base 31 and/or to a circumferential peripheral stand ring 32. On chopping, the underlay 7 prevents the working surface from being scratched, damps the knocks and effect a slipping securement of the chopper 1 on a working surface. When the ice has been reduced to the desired size then the beaker 3 by way of the bayonet closure 33 may be removed from the upper part 2 and by lifting may be removed from the underlay, and the upper part 2 with the blade may now be placed on the free underlay 7. The depositing of the knife 5 on the underlay 7 simultaneously protects the cutter 52 and also the working surface from damage. The underlay 7 preferably has a peripherally thickened circumferential edge bead 71 which prevents melted water which runs down or drips from the knife or other parts of the upper part 2, from running onto a working surface lying below this.

The sidewall 30 of the beaker widens to the top at an angle  $\alpha$  so that with a removed chopper upper part 2 one may fasten a fitting shaker attachment [top] 8 in a clamped manner. The attachment [top] 8, as shown in Figure 3 has a sidewall 81 which tapers downwards at an angle  $\beta$  and which towards the top merges into the neck 83 via a cone 82. In the known manner a sieve plate 84 with pour-out openings 85 is attached in the neck 83, and a lid 9 may be placed on for closure. The angles  $\alpha$  and  $\beta$  (between 1 and 15°, in the preferred embodiment example 4°) and the diameter of the upper beaker region and the lower attachment [top] wall are matched to one another such that the attachment [top] approximately up to the transition of the wall 81 to the cone 82 may be stuck into the beaker and by way of this an adequate sealing of fluids to the beaker is achieved.

The inner wall of the beaker is preferably provided with a grading in 10 decilitres and the shaker attachment [top] lid 9 preferably has a volume capacity of 40 millilitres which is an important measure to barkeepers.

In order to meet the standards of hygiene in the kitchen and bar region, the chopper upper part, beaker, shaker attachment [top] and lid are manufactured of stainless steel and/or of plastic suitable for foodstuffs. All combinations of these materials are possible depending on design and the price class.

## LIST OF REFERENCE NUMERALS

1	ice chopper
2	housing upper part
3	beaker
4	actuating mechanism
5	knife
6	carrier plate
7	underlay
8	attachment [top]
9	lid
11	arbour
12	carrier plate
13	reinforcement rib
17	push button
18	cap
19	shock absorber
20	housing outer wall
21	housing base
30	beaker wall
31	beaker base
32	stand surface
33	bayonet closure
51	blade
52	cutter, 52' cutter
53	teeth, 53' teeth
71	edge bead
81	attachment [top] wall
82	cone
83	neck
84	sieve plate
85	pour-out openings